

**Fabrication and Characterization of Epitaxial PbTiO₃ Thin films
on Pt/MgO(001) substrate**

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Epitaxial PbTiO₃ films with various thicknesses were prepared on Pt bottom electrode layer, which was also epitaxially grown on MgO (001) single crystal substrates. They were grown by pulsed laser deposition using KrF excimer laser at laser fluence of 1.2 J/cm², substrate temperature of 650 °C, and with an oxygen pressure of 50 mTorr. Epitaxial Pt bottom electrode was prepared by RF magnetron sputtering at 650 °C and the film thickness was about 100 nm. Their ferroelectric domain structures were investigated extensively by two-dimensional reciprocal space mapping using synchrotron X-ray diffraction. Incorporation of an *in-situ* high temperature XRD technique revealed that the final equilibrium domain structures are the result of a series of evolution in domain structures during cooling process after film deposition. As the substrate temperature decreased, c-domain abundance, a , was saturated at a value of ~0.95. It was also observed that a was dependent in film thickness. As the film thickness increased further, a was decreased up to ~0.83.